

KID Solar Charging Kit!

MIDNITE SOLAR

"NOW YOU TELL ME!"



**MidNite makes solar
installation easy with our
KID Solar Charging Kit**

Our step by step guide will help make sure installation is easy, and done right the first time. You supply the Solar Array and Batteries, our Kit will provide the rest of the equipment and hardware needed for a basic installation.

THE KID

The KID is the most versatile medium sized charge controller on the market. Ideal for small renewable energy systems. The KID is now available with automatic generator start capability and an advanced lighting controller along with battery protection with a low battery disconnect feature.

THE BIG BABY BOX

The BIG BABY BOX can hold up to four DC circuit breakers in its powder coated aluminum box that won't rust or turn to dust.

Included: The 30 amp MidNite KID MPPT charge controller with easy to wire mounting bracket, MNBIGBABY breaker enclosure with breakers, including Ground Fault Protection, Battery Temperature Sensor, and the hardware and wiring needed to do the job right.

The **KID Solar Charging Kit** provides all the necessary hardware & internal wiring for the KID and BIG BABY BOX to work safely together. The accompanying manual provides easy step by step instructions. If you get stuck or have questions, we have our Industry leading Support Team just a phone call away. You provide the solar array and the batteries, we provide the hardware, internal wiring and support to complete the system.



Approved by
MidNite the Cat








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Midnite Kid Basic Solar Charging Kit

What does my kit come with?

1pc	MNKID-B 30-amp MPPT Charge Controller	
1pc	MNBIGBABY- 4 position breaker box	
2 pcs	MNEPV30- PV and battery breaker	
1 pc	GFP63 Ground Fault Protection Breaker	
2pcs each	Strain Relief wire protectors/Conduit Adapters	



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1 pc	MNBTS Battery Temperature Sensor	
1- 4 foot pc	Flexible Conduit	
1 pc	MNSBB-W Bus bar for PV negative with white insulated standoffs and mounting screws. Red and black not included with this kit	
1 pc	MNSBBN uninsulated ground bus bar with mounting screws	
2 pcs	5 feet of Red and 5 feet of Black #10 THHN wire	
1 pc	MNWRENCH	MNWRENCH for tightening strain reliefs



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What will I need?

Talk to your renewable energy supplier who will help you purchase the solar modules, module mounting hardware and batteries appropriate for your needs. Then use the Midnite Solar KID Charging Kit to tie it all together as a safe and reliable system.

Solar modules- what to buy

The KID is an MPPT "Maximum Power Point Tracking" charge controller. This type of controller optimizes the match between the solar array (PV panels), and the battery bank. To put it simply, they convert a higher voltage DC output from solar panels down to the lower voltage needed to charge the batteries. Because of this your options for solar panels open up dramatically.

Solar modules- how much wattage can the Kid handle?

The Kid has a maximum output to the battery of 30 amps. Because the solar modules rarely produce their rated wattage, it is common to oversize the array by 20% or so. The following wattage ratings are approximations only and it is strongly recommended that you use the **Kid string sizing tool** found on the Midnite Solar website at: http://www.midnitesolar.com/sizingTool_kid/index.php

- On a 12-volt battery the Kid can handle ~ 500 watts.
- On 24-volt battery the Kid can handle ~ 1000 watts.
- On a 48 volt battery the Kid can handle ~ 1500 watts.

Tools needed-

- Appropriate screwdrivers for connectors and mounting screws
- Multimeter
- Wire Stripper
- Wire cutters
- Hammer with a punch or screwdriver for removing knockouts
- The Kid and Big Baby installation manuals (please read these!)

****SAFETY NOTICE****

DO NOT HOOK UP THE WIRES TO YOUR PV PANELS UNTIL THE REST OF THE WIRING IS DONE THIS WILL BE THE LAST STEP IN YOUR ASSEMBLY. KEEPING ALL BREAKERS OFF IS ALSO RECOMMENDED



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Planning Ahead:

Things to consider when selecting a location for the BIG BABY and KID:

Length of wire- The longer the wire the more voltage drop (power loss) you will have. If you need to run a long distance, it is recommended to use a larger size wire for that specific connection. The KID wall mount terminals will hold a maximum wire size of #8, the internal terminals will accept a maximum wire size of #10. If your wire run requires wire larger than #10, the best place to transition down to #10 is inside the Big Baby Box. The circuit breakers can accept up to a #6 wire. There are several handy online wire sizing calculators available. Here's one example:

<http://www.calculator.net/voltage-drop-calculator.html>

Environment- The BIG BABY and KID should both be mounted indoors or in a protected space. Neither of them are intended for outdoor applications. You will be using flex conduit to protect the wires going from the BIG BABY to the MNKID. If you plan on locating these two further away than 4 feet you will need to provide your own conduit.

Ease of wiring- Think ahead on how each component will connect to the next. Allow ample room for routing of wires and access to frequently accessed devices. We recommend placing the BIG BABY directly under the MNKID.

Component Mounting- There are mounting holes in the back of the Big Baby and the KID has 4 mounting holes located in each of the four outer corners of the plastic case. Please consult your KID manual or see http://www.midnitesolar.com/pdfs/10-293-1_REV-E_KIDManual.pdf for additional instructions on how to mount and set up the KID.

Installation:

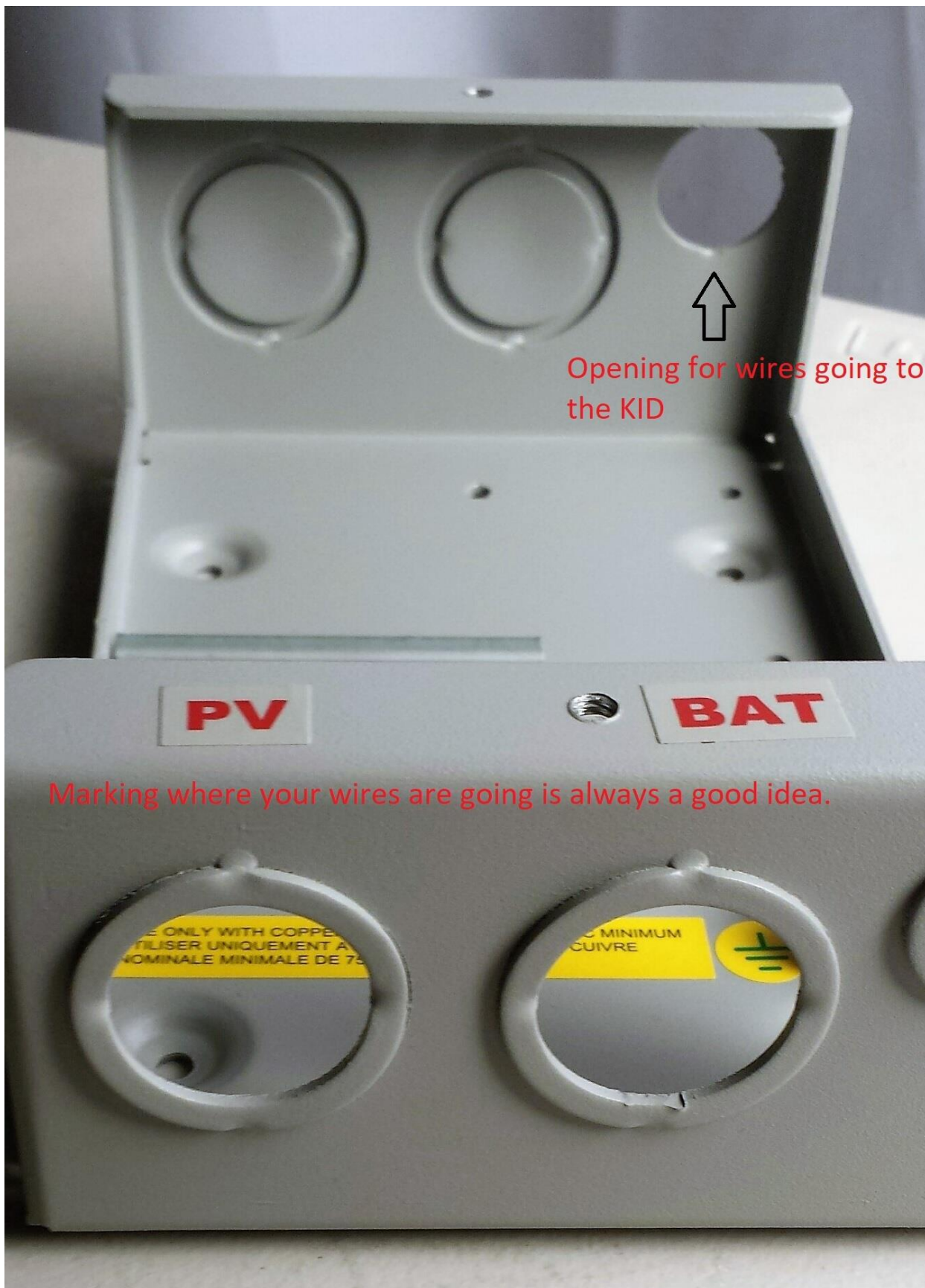
Knockouts and Strain Reliefs

The Big Baby has knockouts at the top and bottom that you will need to remove to run your wires through. Take a screwdriver or punch and place it on the outer edge of the circle you are knocking out, taking care to avoid the small attaching points. To reduce the risk of bending the top and bottom of the Big Baby Box during knock out removal, it is best to have the front cover installed for providing additional support.

(HINT) When removing the knockouts, make sure to only remove the minimum amount needed for the threaded portion of the strain relief.

Gently tap on the screw driver or punch with a hammer until the circle plug starts to bend inward. Move to the opposite side of the circle and do the same. Work the plug back and forth until it comes loose. Once the knock out is removed you can install the wiring Strain Relief.







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Open the Big Baby by removing the 2 screws in the front. Remove the bottom nut from each strain relief and insert them, with threads to the inside, through the top and bottom knock out holes. Firmly hand tighten the nuts to secure the strain reliefs to the Big Baby. The Conduit adapter will go in the top of the BigBaby.



Installing the Negative Busbar





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All of your Negative wires will come to this busbar. To install it there are 2 screws in the KIT that will attach the black mounting brackets to the BigBaby.



Big Baby Wiring

NOTE: Please consult your KID manual or see http://www.midnitesolar.com/pdfs/10-293-1_REV-E_KIDManual.pdf for accessories that might need to be wired at this time such as ground wires, load and load wiring, etc.

(HINT) Leave yourself some extra length of wire pulled into the Big Baby so you can make your connections more easily. Once the wiring is complete, some of this excess can be pulled back out but be sure to leave a small amount of slack inside the box to minimize strain on the connections.

Solar GFP and breaker wiring

Run the wires that come from your solar module through the bottom of the BigBaby. There are holes in the Strain Relief for passing the wires through and into the box. If the fitment of the wires seems loose, you can tighten the adjustment by twisting the top adjuster nut using an adjustable wrench or large pair of pliers.

You can run the wires to the solar modules, but do not make the final connections yet or you will be working with live wires. Make sure all breakers are off.



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The breakers when installed should have the letters right side up and the breaker handles should be in the off position.



(HINT) When stripping wire, it is recommended to only strip enough insulation off the wire to fit into your connector, approximately 3/8" for this breaker and for the negative busbar.

Why use Ground Fault Protection?

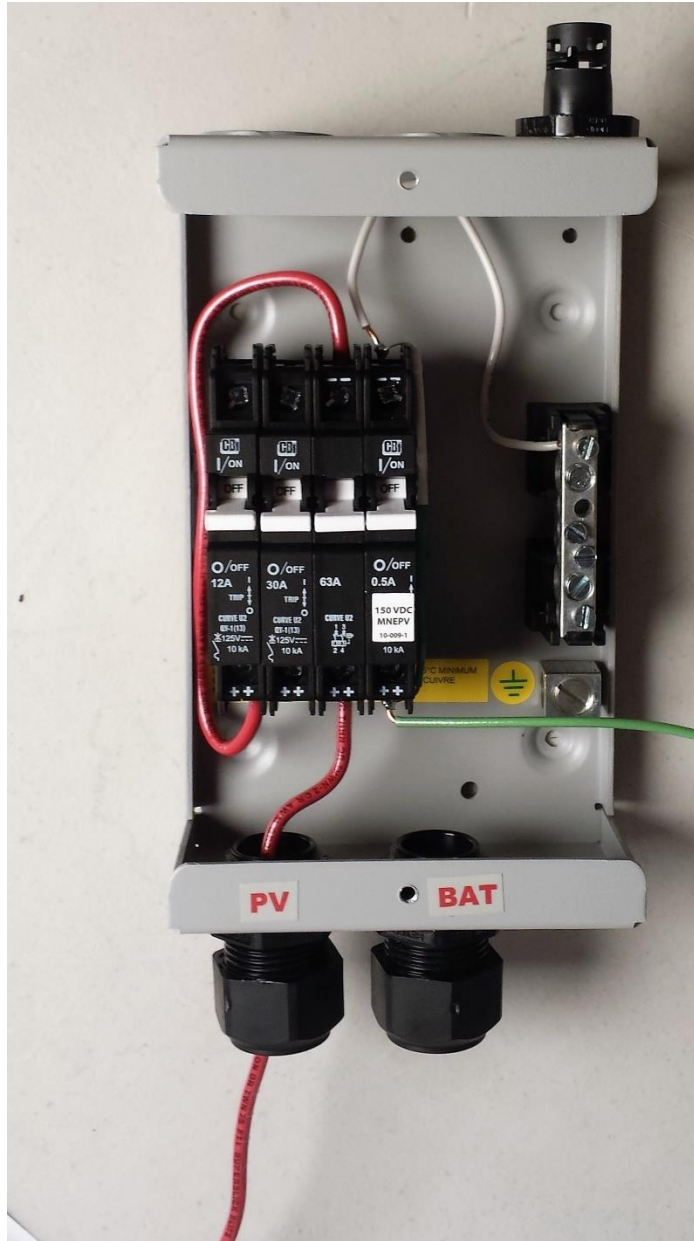
A Ground Fault Protection (GFP) will disconnect the solar array from the power system in the event of a ground fault. This protects your equipment from the effects of a ground fault and is required by the National Electric Code.



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Wiring the GFP-63 breaker

The positive PV wire connects to the bottom (the ++ end) of the MNDC-GFP63 breaker on the left-hand side. From the top of the MNDC-GFP63 breaker on the left-hand side, the wire wraps around to the bottom of the PV Breaker. The wire from the top of the PV breaker goes up to the PV + connector in the KID.



The negative wire connects to the negative bus bar. Followed by the white wire from the MNDC-GFP63.

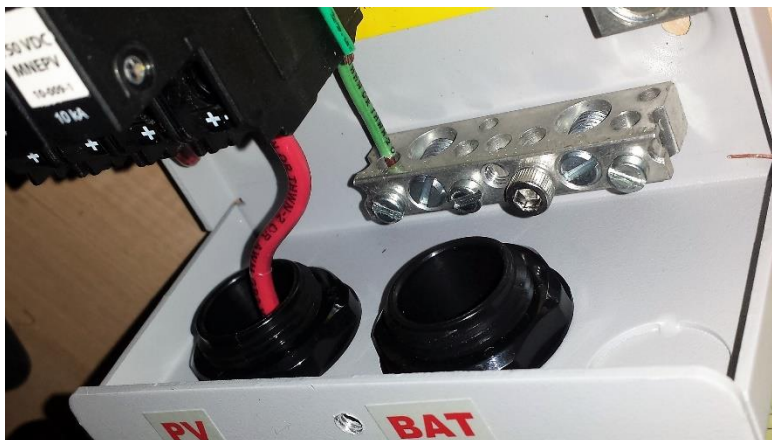


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Mounting the ground bus bar

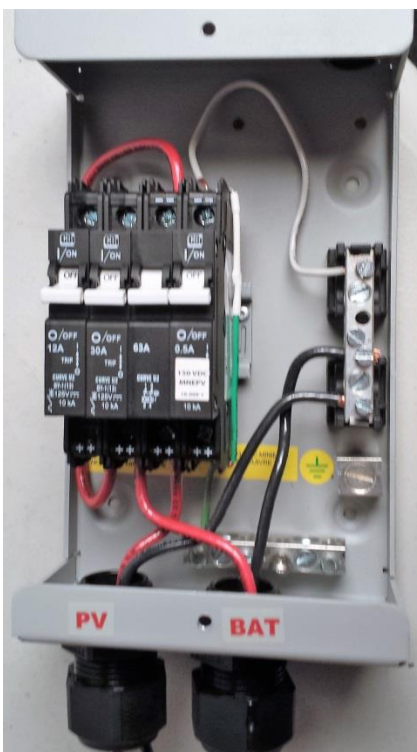
At this time, you can install the non-insulated grounding bus bar in the mounting hole right next to where the battery wires will come into. You will use the fastening hardware for this.

Note that the Green wire from the GFP -63 will go right into it. This also where the ground wire goes that is connected to a ground rod or other approved grounding system.



Battery breaker wiring

The **#10 AWG** positive and negative wires from your **battery** should come into the bottom of the BigBaby via the 2nd set of holes in the strain relief. The positive wire connects to the bottom (the ++ end) of the **MNEPV30 breaker**. The negative wire connects to the negative bus bar.





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Estimate the length of wire needed to go from the Big Baby to the KID terminal block. Cut and install two #10 negative wires of appropriate length to the negative bus bar, then two #10 positive wires to the top of the two breakers (the - - end). Pass all four wires out of the top strain relief. Connect your Earth ground wire to the Ground busbar and run that out the top of the KID with the other four wires.



Important: The circuit breaker torque value is 20 inch-pounds (2.3NM). You should tighten to this specification during installation and again one hour after the installation is powered up. Do not omit the second tightening! A loose wire can cause arcing, melting of bus bars and fire.

Once the conduit adapter is in place on the BabyBox and the Kid you can connect the flex conduit to them. Twisting clockwise while pushing onto the end of the adapter will tighten it.

(HINT) The warmer the conduit the more flexible it is. If you find that you can't get it over the top of the adapter heating it up with a hair dryer or hot air gun will help.



Run all five wires through the conduit tubing.



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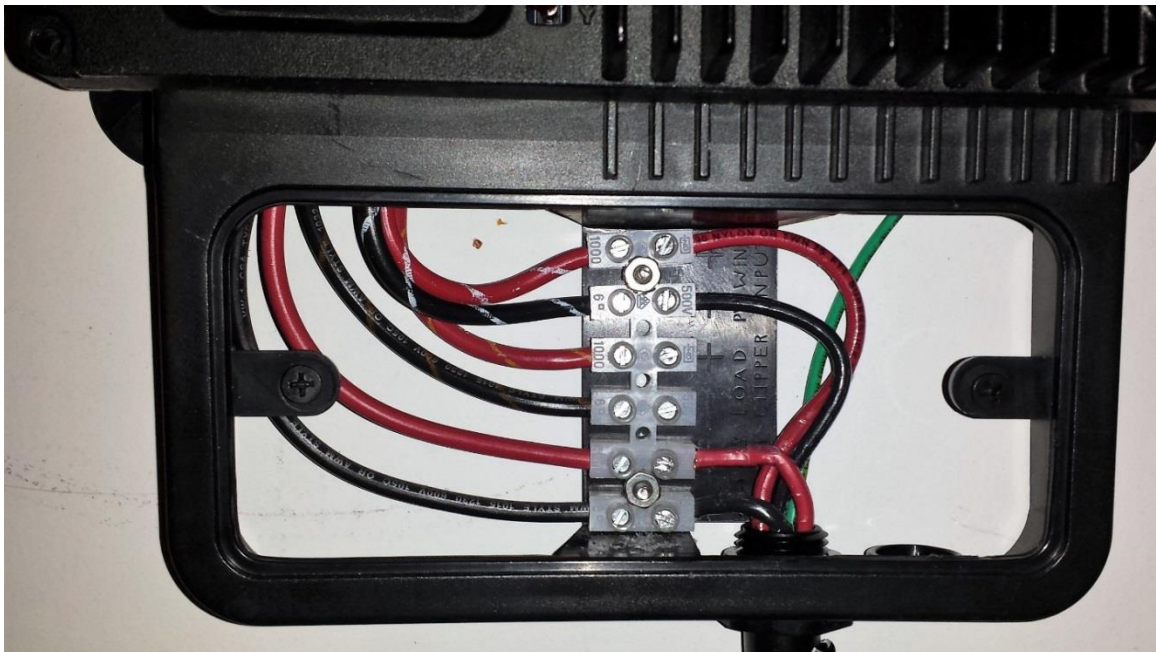
Marking your wires is ALWAYS a good idea

Wiring the KID Controller

To make the final connections to the KID, take the two solar wires coming from the top of the Big Baby and pass them through conduit and connect them to the PV Plus and PV Minus terminals. Pass the two remaining battery wires from the Big Baby through the conduit and connect them to the Battery Plus and Battery Minus terminals. **When making the KID connections, polarity matters.** Connect the Ground wire to the ground lug on the KID (see KID manual for this step)



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Do NOT make the final connection to your battery terminals at this time or you will be working with live wires!

We recommend installing the MNKID at the highest point in your installation. Since the wiring comes out the bottom of the MNKID, it is easier to run the conduit straight down to the BIG BABY.

The mounting bracket for the MNKID has a plastic knock out on the bottom right hand side. It is much easier to remove than the one for the BIG BABY. There is a hole plug in the KID that looks like this:



It will go in the right-hand side knock out in the KID to allow your use of the Temperature Sensor unit:





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Please see <http://www.midnitesolar.com/pdfs/Kid-Manual-1797-REV-E.pdf> for Startup procedures and other accessories that might need to be wired at this time such as Ground wires, AUX controls, battery temperature sensors, etc.

Once you are sure that your wiring is completed, your polarity is correct, and your settings are correct, you are ready to power everything up:

1. Make sure your breakers in the BIG BABY are off
2. Make the final connections to your battery terminals
3. Make the final connections to your solar modules
4. Using the multimeter, verify proper polarity and expected voltage between the bottom of the two circuit breakers and the negative bus bar.
5. Turn on the battery breaker first. You should see the display panel light up and LEDs flashing.
6. Enter your battery and other programming. Read the Kid manual for set up procedures.
7. Once the Kid is operating as expected and the setup procedure is complete, the GFP and solar breakers can be turned on.

Your system is now active. You can finish installing any front covers or protective measures that might be needed.

For warranty information please refer to the manuals that came with your equipment. Save all the manuals that came with your equipment and keep them in a system folder. They tend to come in handy at times!

For support for all Midnite Solar Products:

By phone: 360-403-7207

By email: support@midnitesolar.com

Support ticket system: <http://www.midnitehelp.com/>

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